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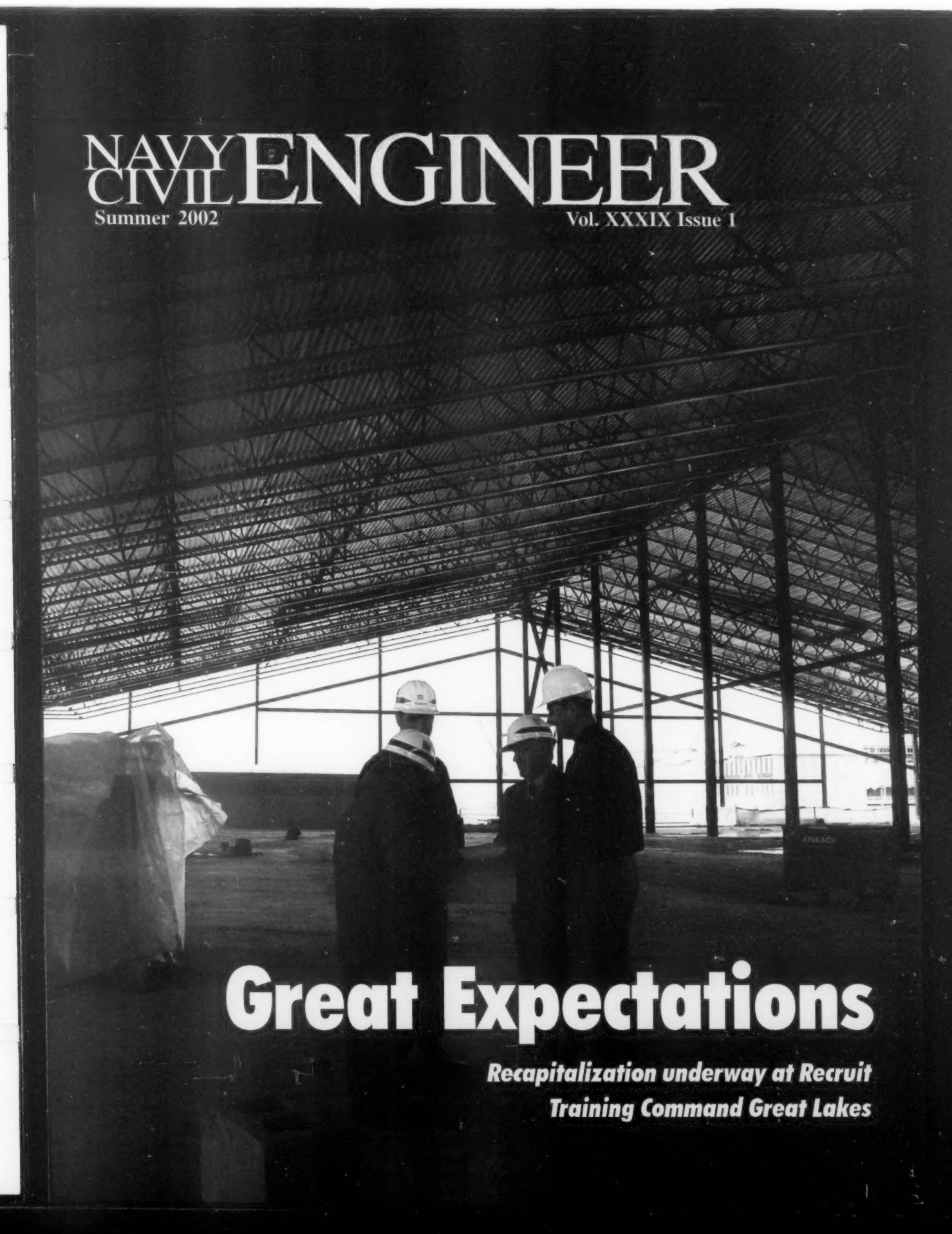

Great Expectations

Recapitalization underway at Recruit Training Command Great Lakes

Speaking from Topside

Rear Admiral Michael R. Johnson

This Speaking from Topside is about "One Facilities Engineer Voice." In speaking with "One Facilities Engineer Voice," we act as one support to the Navy and Marine Corps mission. The professional, timely, best value public works and facilities support is founded on the competence of our global Civil Engineer Corps, Navy civilian and contract workforce. It is independent of Command, independent of billet, and independent of location. It is our contribution to the Navy and Marine Corps Team, and it is a critical element of our contribution to our Nation's readiness.

I want to address a concept which I believe is central to improving facilities support to the U.S. Navy and Marine Corps—the strongest Navy-Marine Corps Combat Team in the world. It is called "One Facilities Engineer Voice" and it is a critical element of our contribution to our Nation's readiness. Facilities support is crucial, and has never been more important to our military. Whether you work in a Public Works Center, a Public Works Department, an Engineering Field Division or Activity, a NAVFAC Specialty Center like the Crane Center, Construction Battalion Center, or Engineering Service Center, within the Naval Construction Force, or on a staff supporting facilities work in a Claimancy, Fleet, OPNAV and the Secretariat, you are a part of the facilities team. Also everybody involved in facilities support within the Department of the Navy, really the Department of Defense, officers, enlisted, active, reserve, civilians, and contractors all play a key role.

One Facilities Engineer Voice is crucial — each and every one of us on the facilities team is directly and inextricably tied to each other. You are part of a Navy-Marine Corps team that is bigger than the command in which you serve. Each person and organization within NAVFAC advances the skills, tools and processes to build and strengthen our core capabilities through quality service to our clients.

There are many interpretations of what "One Facilities Engineer Voice" really means. First and foremost, "One Facilities Engineer Voice" does not mean only one person's voice. It is our voice as a Team—working together with the goal mission accomplishment for the Navy and Marine Corps.

The concept of "One Facilities Engineer Voice" can be broken down into five basic principles, which, if we follow them, will improve our team, improve our support to the Navy and Marine Corps, and improve readiness. It is important to remember: Mission First, People Always!

The first principle: Leadership and Professionalism are our Foundation. This is what I mean about being a professional: you know your job, you know how it fits in the team, you know what will work and what won't, and you know that you have a larger team of professionals backing you up. Work to be the professional you want to be. Seek out a mentor and get some good advice. Work to improve the system, which I think sets the professional apart from one who just does the job.

And a professional really never says "No" as his or her first response to a request from a client. Even if we have to say "no" eventually, the interaction is immeasurably improved if we started out with, "Yes, I understand what you're saying, and I'd like to understand how we can help you with that." You will be surprised how well this works.

Second: Understand your role and how you fit into the Big Picture. Every one of us is part of the whole. No single NAVFAC employee should do it all nor should they try. We must know our strengths and limitations and those of our teammates. It is important that you understand what you look for to accomplish the job.

Our Liaison Officers play a key role in helping Clients turn mission requirements into deliverables our Facilities Team can provide. They help focus the NAVFAC team on Client success and facilitate teamwork among our various service providers. We expect our Liaison Officers to represent the strengths of all components of the Facilities Team, help keep our message consistent, and keep our Clients informed as the work is being executed.

Within NAVFAC, we all fit together through our Business Lines. We have established Business Line Managers that work to improve business processes, resource distribution, and information flow to make your jobs more efficient. Meanwhile, you work for a supervisor in a chain of command starting from your commanding officer, who provides direction on what to work on, schedules, priorities, and so on to move the work along. The Business Line Managers bring support on how to accomplish the job, the supervisory chain provides leadership and mentoring, creates the environment to succeed, and supports what to do and when.

You can find this relationship in a regional structure with program managers and commanding officers. Or on a staff with functional relationships and staff organizations. Or even within operational commands. You all fit in these structures, and you can be more effective if you understand how you fit. It is vitally important to see that you fit into a bigger picture that encompasses people outside of your specific work area. Many of you work in or are involved with an Integrated Product Team. Public Works Centers, Engineering Field Divisions, Engineering Field Activities, Public Works Departments, Naval Construction Battalions, Amphibious Construction Battalions, Staffs and Specialty Centers all rely upon one another.

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For microfiche users, the index and/or contents is contained on a separate fiche.

Pier Replacement Underway at Norfolk Naval Station

At Naval Station Norfolk, the fleet is able to moor ships on the south side of the newly constructed Pier 2. The pier, which is the second of three piers that will be constructed at Naval Station Norfolk, was completed in April 2002. Pier 6, which was the first pier to be constructed, was completed in November 2001.

The piers are designed with the Navy's newer ships in mind. These ships require more electrical power. The taller piers also provide better mooring during strong winds and high seas. During the ribbon cutting ceremony for Pier 6, Rear Admiral David Architzel, Commander Navy Region Mid-Atlantic, praised the many dedicated people and organizations that made the pier possible. "This is the beginning of the recapitalization of the Naval Station Norfolk waterfront," he said. "This pier, and the ones to follow, will ease the burden on ship's crews and Navy Public Works Center, Norfolk."

Left to right: Steve Lantz, ROICC Sewells Point project engineer; Ed McLaughlin, president Tidewater Skanska, Inc., Rear Admiral Bob Phillips, LANTDIV, Congressman Ed Schrock, Captain Joseph Bouchard, CO Naval Station Norfolk, and Rear Admiral David Architzel, Commander Navy Region Mid-Atlantic, cut the ribbon officially opening Pier 6 in November 2001.

Photo by John Land

Electrical workers David Murphy and Ronald Barber from the Navy Public Works Center, Norfolk, pass electrical cables up to sailors on the second deck of the USS RADFORD from Pier 6. The pier's second deck is 21 feet above water level and open with plenty of room for PWC vehicles and cranes.

The first deck of Pier 6 is enclosed with a nine-foot ceiling to allow trucks to service telephone lines, fiber optic cables, and electric cables. On current piers, these are under the piers where they are exposed to the elements and can only be accessed by boat at low tide. The second deck is 21 feet above water level and open. It will be used by ship's crews and visitors, and by vehicles bringing supplies and equipment to the ships. The in-house design for Pier 6 won the Engineers Club of Hampton Roads Outstanding Achievement Award for 2001.

The concrete piers are 1,500 feet long and 93 feet wide. The lower deck is made of pre-cast pieces that fit together like building blocks. The upper deck is cast-in-place concrete. Each pier costs between $35 and $40 million, depending upon the amount of dredging and demolition needed, and takes about two years to build.

"PWC Norfolk is excited about the new double-deck piers opening," said Public Works Center Utilities Department Head Tom Barstow. "The top deck provides plenty of room for our vehicles and cranes, as well as for contractor support, even with seven ships berthed at a pier. Our utility systems on the lower level are more protected from the weather and we expect that this will increase the life span of our shore power cables and mechanical hoses."

The construction contract for the third pier, Pier 7, was awarded on February 12, 2002, for $53 million. The contract includes demo of two existing piers, pile removal and dredging, plus construction of a new concrete double-deck pier to be completed by November 2004.

NAVFAC Selects Engineers of the Year

John "Jack" A. McCarthy from Southern Division, NAVFAC, Charleston, S.C., and LCDR Michelle C. La Duca from Navy Region Southwest have been named Naval Facilities Engineering Command Civilian and Military Engineers of the Year for 2002. They competed for the National Society of Professional Engineers Engineer of the Year award and McCarthy was selected as one of the top 10 Engineers of the Year.

McCarthy is recognized as the structural masonry expert and chief structural engineer at SOUTHDIV and is the Structural Engineering Branch Head and Chief Structural Engineer. He leads the recruiting efforts for top quality junior structural and geotechnical engineers and instituted formal training programs, on-the-job training, mentoring, rotational assignments, and workload/skills assessments to fully develop new associates and maximize the efficiency and technical quality of SOUTHDIV's structural engineering capability. McCarthy helped develop the masonry bond wrench, which tests flexural strength of mortar joints. This test method is now American Society for Testing and Materials Standard C1072.

Rear Admiral Michael K. Loose, Vice Commander, NAVFAC, presents Engineer of the Year awards to John A. McCarthy (left) and LCDR Michelle C. La Duca (below).

LCDR La Duca is the program manager for facilities management for Navy Region Southwest (NRSW). She is directly responsible for resourcing and facilities policies for facilities at eight naval bases in NRSW with a current plant value in excess of $6 billion. La Duca developed and managed the Regional Engineer budget totaling more than $250 million ensuring that NRSW Base Operating Support and Sustainment, Restoration, and Modernization requirements are clearly articulated, budgets established and projects executed. She was also instrumental in establishing key policy measures including the Regional Engineer Strategic Business Plan, Regional Engineer Procedural Manual, and the Regional Standards for Custodial and Grounds Maintenance.

An official ribbon cutting ceremony for the new Carrier Berthing Wharf at Naval Air Station North Island, Calif., was held on May 20, 2002. The new wharf was constructed and completed in April 2002, to support the nuclear-powered aircraft carriers. Currently, the USS STENNIS (CVN 74), USS NIMITZ (CVN 68), as well as USS CONSTELLATION (CV 64), a conventional powered aircraft carrier, are stationed at NAS North Island. Besides the new wharf, a storage warehouse, equipment staging building, and a fleet recreation center was also built. The 90-feet wide by 1,300-feet long wharf runs parallel with San Diego Bay.

NAVFAC Sees Early Transfer of Mare Island Shipyard to City of Vallejo

On March 26, 2002, NAVFAC and the City of Vallejo, Calif., completed early transfer of Mare Island Naval Shipyard, the largest and most complex base conversion of this type in the Department of Defense.

From the beginning, a NAVFAC team was assembled to negotiate and coordinate with the City of Vallejo and their prime developer, Lennar Mare Island. Experience and knowledge from within several business lines were required for this effort – environmental, utilities, legal, contracting, facilities, real estate, and base realignment and closure. Supporting the effort at different stages in the process, Navy leadership established the vision for the team and facilitated resolution of major roadblocks along the way.

In April 2000, the City of Vallejo requested early transfer of a major portion of former Mare Island Naval Shipyard termed the Eastern Early Transfer Parcel (EETP). A 1998 addition to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) permitted conveyance of property before all environmental cleanup is completed, i.e., early transfer. The City will complete the environmental cleanup of the conveyed property under an innovative Environmental Services Cooperative Agreement (ESCA) wherein the Navy provides the $78 million and the City agrees to achieve environmental regulatory closure. This early transfer approach, along with the ESCA, accelerates conversion and economic development and saves money for both Navy and the new owner.

One of the major challenges in the early transfer conveyance was with the Environmental Protection Agency's (EPA) policy on polychlorinated biphenyls (PCBs). EPA's position was that real estate transactions involving sites with PCB contamination are a violation of the Toxic Substances Control Act (TSCA) even if PCBs are embedded in material such as concrete. Navy, City, State and developer involvement was required to overcome this hurdle. After numerous discussions a Consent Agreement provided a solution acceptable to all stakeholders.

CAPT Gary Engle, Commander, NAVFAC SOUTHWESTDIV, presents a Navy flag to Vallejo, Calif., Mayor Anthony Intintoli, Jr., as a symbol of the transfer of the main properties of the former Mare Island Naval Shipyard, Vallejo, Calif.. The flag will be housed in the Mare Island Historic Park Foundation Museum.

This early transfer parcel is 668 acres and 900 plus buildings right in the heart of the developed Island – including numerous heavy industrial shipyard facilities and several residential and historic areas. The environmental responsibility for completing the cleanup of this part of the oldest Navy shipyard on the West Coast now rests with the City of Vallejo. The City and their developer can expedite cleanup in targeted areas for redevelopment, job creation and revenue generation. The City's economic development initiatives are reconnecting the island to the City of Vallejo and the thriving Bay Area. Summing up this herculean effort, H.T. Johnson, Assistant Secretary of the Navy wrote to the Mare Island BRAC Team, "This is a great day for the Department as it sets a new standard of excellence. More importantly, the real benefits will be realized by the people of Vallejo, Lennar, other BRAC bases and the Department of the Navy."

Two Tapped for Civil Engineer Corps Flag

Captain Richard E. Cellon, CEC, USN, and Captain Raymond K. Alexander, CEC, USNR, have been selected for promotion to the rank of Rear Admiral (lower half).

Captain Cellon is currently assigned as Commander, SOUTHDIV, NAVFAC, Charleston, S.C. He was previously assigned as Executive Officer, Navy Public Works Center, Norfolk, Va. Other assignments include Commanding Officer, NMCB 40, Port Hueneme, Calif.; and Commanding Officer, Naval Support Facility, Thurmont, Md. Captain Cellon, a native of Gainesville, Fla., graduated from the U. S. Naval Academy. He holds master's degrees from the University of Florida and the Naval War College. Captain Cellon also attended the Wharton School's Advanced Management Program at the University of Pennsylvania. He is a registered professional engineer in the state of California, a member of the Acquisition Professional Community, and a Seabee Combat Warfare Officer. He holds a Level III Contracting Warrant. His personal decorations include the Defense Superior Service Medal, three Meritorious Service Medals, two Navy Commendation Medals, the Navy Achievement Medal, and various unit and campaign awards.

Rear Admiral (sel) Richard Cellon

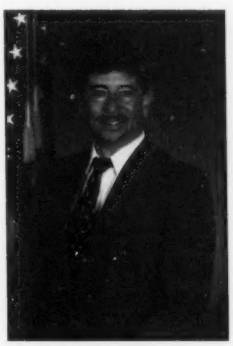
Captain Alexander is currently serving as the Commander, THIRD Naval Construction Regiment, Atlanta, Ga. Previous assignments include Operations Officer and Chief Staff Officer of the THIRD NCR; Assistant Training Officer for the FIRST NCB; Deputy Command Engineer for Contingency Engineering, U.S. Southern Command; and Branch Manager, Naval Reserve Contingency Engineering Management, Naval Forces Central Command/ Deputy Engineer, U.S. Central Command. Captain Alexander holds a bachelor's degree from the University of Mi-chigan, a mas-ter's degree from the University of Tennessee, and he is a registered professional engineer in Tennessee and Alabama. He is currently employed with the Tennessee Valley Authority, Chattanooga, Tenn., as the Manager, Corporate Nuclear Engineering Design Group. Captain Alexander's personal awards include the Legion of Merit, Bronze Star Medal, Defense Meritorious Service Medal, Meritorious Service Medal, Navy and Marine Corps Commendation Medal with Gold Star, Navy and Marine Corps Achievement Medal. He is also a qualified Seabee Combat Warfare Officer.

Rear Admiral (sel) Raymond Alexander

2001 Moreell Medal Winner Selected

Ralph Torres, Base Operations Support Business Line Manager, Naval Facilities Engineering Command, Southwest Division, San Diego, Calif., was selected as this year's Moreell Medal winner. The award is given annually by the Society of American Military Engineers to an officer of the Navy Civil Engineer Corps, regular or reserve, on active or inactive duty or retired, or to a civilian employee of NAVFAC in recognition of the most outstanding contribution to military engineering.

Torres is being recognized for his extraordinary performance as a Business Line Manager. His exceptional leadership and business acumen were instrumental in the successful negotiation and purchase of low cost electricity for Navy and Marine Corps bases in Southern California during the electricity crisis. As a direct result of Torres' outstanding negotiations and partnering, attention to detail, and contract innovations, NAVFAC purchased electricity through contracts with the Department of Energy, Western Area Power Administration, and an independent energy supplier, Strategic Energies. These contracts enabled the Navy and Marine Corps to secure reliable power at rates that will save approximately $80 million over a four-year period. Torres led our best technical, acquisition, and legal experts throughout the Navy Region Southwest, Public Works Center San Diego, and NAVFAC to develop and award new utility contracts. These actions significantly reduced financial impacts to the Navy and Marine Corps and protected the installations from the volatility and uncertainty of the California electricity market.



Ralph Torres

NRSW Energy Team Stays Ahead of Energy Crisis

On October 18, 2001, Vice President Dick Cheney presented the 2001 Presidential Award for Leadership in Federal Energy Management, the highest award for a federal energy management program, to the Navy Region Southwest Energy Team for its work during the California Energy Crisis. Navy Region Southwest is one of only four organizations selected for this prestigious award from the entire federal government and one of only two from the Department of Defense. The Presidential Award was created in 2000 to honor employees from all federal agencies for their support, leadership, and efforts to promote and improve Federal energy management.

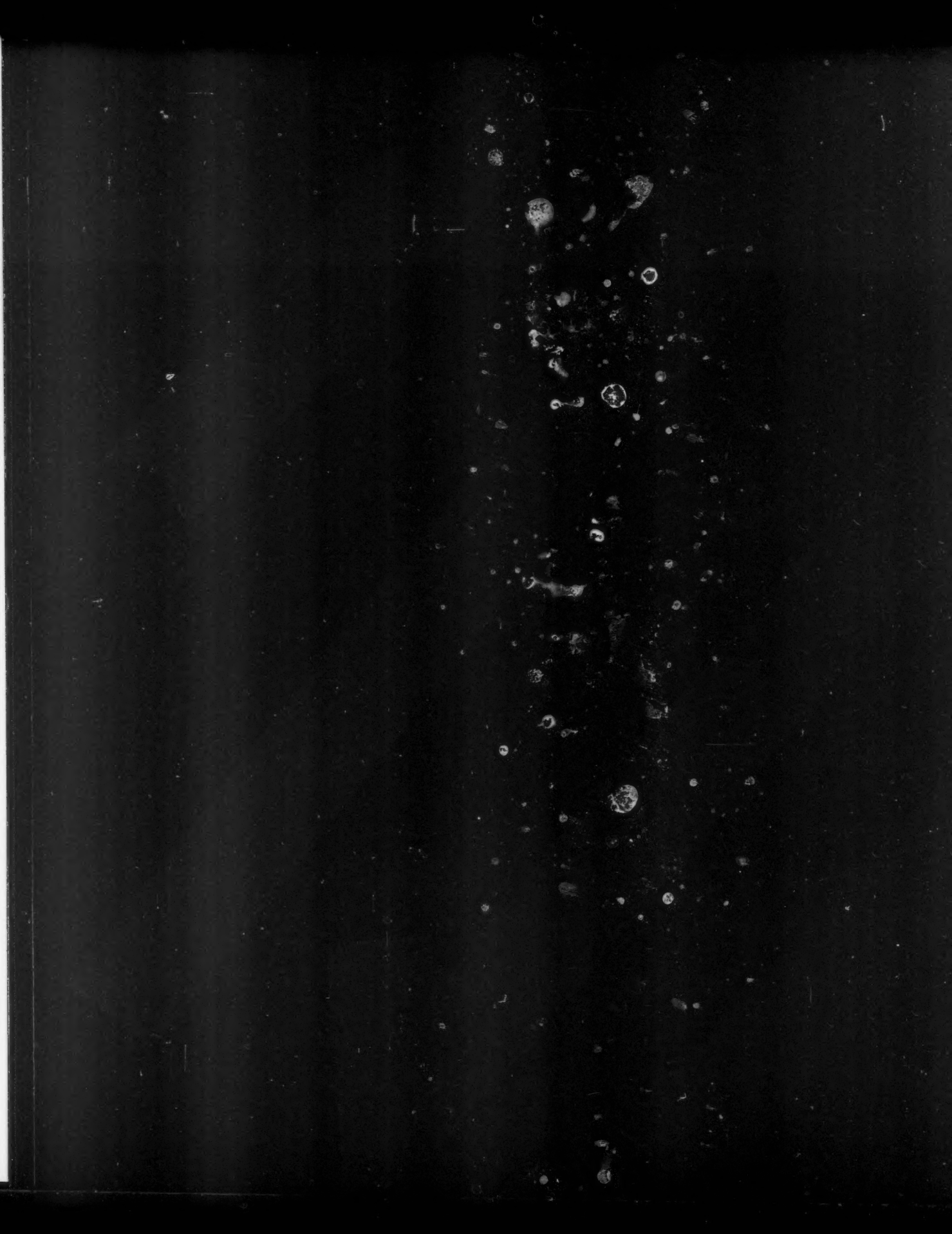
In late May 2000, Navy Region Southwest (NRSW) sailed into an energy crisis unparalleled since the oil embargo of the early 1970's. Although the California electrical storm hit almost without warning, the Navy was not unprepared. Under the leadership of Public Works Center San Diego and Assistant Chief of Staff (ACOS) - Facilities for NRSW, the Navy had instituted a broad range of energy management initiatives prior to the Summer of 2000 which enabled it to proactively respond to the crisis and greatly minimize the impact on operations and quality of life. Perhaps the single most important action taken before the crisis was the creation of the NRSW Energy Team. This team, comprised of top energy managers, engineers and contracting officers drawn from NRSW; Public Works Center Sand Diego; Southwest Division; the Naval Facilities Engineering Service Center (NFESC); and the Naval Facilities Contracting Office (NAVFACCO), was created to conduct the NRSW energy program throughout its two-state footprint.

At the first signs of the developing electricity crisis, the NRSW Energy Team took immediate action to cut NRSW electrical demand in the San Diego area. NRSW took a broad range of initiatives in accordance with its three part strategy to secure reliable electricity, natural gas and water supplies for the Navy, at stable and affordable prices; upgrade the energy efficiency of NRSW facilities, and cut energy and water demand through aggressive energy management measures and an intensive energy awareness program. The actions taken in response to this direction included NRSW issued top-level energy policies and prescribed rigorous load reduction measures; NRSW set a 20 percent reduction "stretch goal" in peak demand under its utility demand reduction program, a condition that remains set today and is now considered the normal condition; the Regional Energy Program Office issued daily energy updates and load reduction alerts; PWC read key electric meters weekly and provided shoreside electrical load profiles for the three San Diego area bases and for the "top 10" buildings at each base. Additionally, NRSW entered into close partnerships with the Federal Energy Management Program (FEMP), the California Energy Commission (CEC), and regional energy agencies to coordinate programs, share information, and to bring all possible resources to bear on the crisis.

In September 2000, the Navy awarded $21.8 million in financed utitility energy service contracting (UESC) contracts to upgrade shore facilities energy efficiency at NRSW bases. While executing this program, the Navy initiated follow-up surveys to identify further NRSW energy conservation opportunities and awarded an additional $24.4 million in UESC financed projects in September 2001. In August 2000, PWC put in place a Web based system, MVWeb, to make building-specific electrical demand and consumption data available to building monitors and others for the first time. MVWeb became one of the most important tools in helping NRSW cut demand throughout the crisis.

NRSW published its 44-page Regional Energy Management program directive in April 2001, incorporating the state of the art in energy management principles and practices, adopting Federal Energy Star standards for equipment, and adopting the more rigorous of California Title 24 or current Navy energy design standards for new construction. As a major part of its demand reduction efforts, NRSW greatly expanded the scope and intensity of its energy awareness and training program.

Today, the NRSW Energy Team continues to pursue ever more cost-effective supplies of utilities as the $68 million financed projects awarded in 2000 and 2001 come on line to make NRSW facilities as energy efficient as practical. NRSW is developing additional energy projects, is fostering the widest implementation of the latest energy technologies, and is rapidly becoming a leading producers of clean, renewable energy.



Great Expectations at Great Lakes

At Recruit Training Command Great Lakes, the Naval Facilities Engineering Command is helping to improve the training of future Sailors. As the Navy's only Recruit Training Command, RTC Great Lakes processes more than 50,000 recruits each year. Leading a $750 million recapitalization at Great Lakes, NAVFAC will provide these recruits with state-of-the-art, efficient facilities and improve the quality of service for new recruits and the training staff. The following articles provide an overview of the facilities being constructed at RTC Great Lakes, which include a drill hall, barracks facility, physical training facility, and battle stations complex.

Far right: An exterior view of the Drill Hall facility construction site.

Right: Nearing completion, Mr. Jimmy Stewart of SouthDiv, LT Brian Lindoerfer, ROICC Project Manager, and LT Dan Cook, APWO for RTC, tour the Drill Hall facility.

Photo by PH1 Michael Wormer

Equipping Sailors

By LCDR John Wallach, Assistant Chief of Staff for Public Affairs, and JOC Rhonda Burke, Great Lakes Public Affairs Officer

A front view of the RTC Small Arms Range

The young men and women who earn the right to become Sailors in today's Navy will set the course for those who follow in the 21st Century. They are the senior enlisted leaders and officers of the future — and their careers start here at Naval Training Center Great Lakes, Ill. With nearly a billion dollars in military construction projects slated for the Navy's only Recruit Training Command over the next several years, the future of the Navy can be found in training at Naval Training Center Great Lakes today.

In the spring of 1999, a groundbreaking ceremony was held to mark the start of a $750 million Recapitalization for Recruit Training Command Great Lakes, which will result in modern, efficient facilities suited to the training requirements of America's 21st Century Navy.

By late summer 2002, the face of

r the Future

RTC will change drastically. Four new buildings will replace worn structures and improve the quality of training of today's Sailors. The facilities being constructed include:

• A Drill Hall, which will provide for indoor training for recruits during inclement weather. This $11.7 million building is scheduled for completion very soon.

• A Ceremonial Drill Hall that will house weekly recruit graduations for attending guests and visiting dignitaries. This $12 million building is scheduled for completion in 2003.

• A Physical Training Facility, totaling 182,600 square feet, will include four running tracks, basketball and volleyball courts, and support spaces to allow more than 1,700 recruits to exercise simultaneously on two interior levels. Estimated completion date for this $32 million building is by the end of this summer.

• A state-of-the art barracks facility, with a total of 344,000 square feet, will house 2,112 recruits and include classrooms, offices, kitchens and dining rooms. Completion date for this $64 million complex is also by the end of this summer.

About $18 million in other boot camp projects including a $9.93 million Combat Training Pool, $6.79 million indoor Small Arms Range, named USS WISCONSIN, and a $1.38 million outdoor track, were completed in 2001. An $11 million Recruit Inprocessing Barracks, named the USS MASON, was dedicated in late November 2001. The building houses recruits on the Inprocessing side of RTC, during their initial "p-days." The barracks facility is self-contained with its own galley and classroom facilities, eliminating the need for newly reported recruits to march more than five miles per day to eat and complete processing paperwork.

The building program marks a significant milestone in the proposed 10-year recapitalization program at RTC. During this time frame, it is planned that key training, housing and related support facilities at the base will be reconstructed. This effort will result in increased quality of training and improved living conditions for Sailors in basic training.

By the time the projects are completed, around 2009, the new buildings will have replaced nearly all the structures built between 1942 and 1966. Construction will continue throughout 2002 - 2009, with the primary emphasis on replacing barracks facilities with complexes containing individual galleys and classrooms.

The largest single project will be a state-of-the-art Battle Stations Complex, estimated to cost $60 million,

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planned for construction in 2004. Assembled in an empty warehouse in 1997 with no small measure of plywood, sweat, makeshift plumbing and old-fashioned Sailor ingenuity, Battle Stations has evolved gradually yet considerably from its humble beginnings. Nearing its fifth anniversary, the 12-hour exercise pushes recruits to their physical, mental, and emotional limits, requiring them to draw on every aspect of their training to date. Hundreds of thousands of today's Fleet Sailors have its 12 events — and presumably its lessons — indelibly etched into their memories. Indeed, few will ever forget the emotional completion ceremony, during which recruits trade their "RECRUIT" ball caps for those with "NAVY" emblazoned across their fronts, the symbolic transition from recruit to Sailor.

Now, with the help of the world's leading experts in the entertainment industry, the Navy is working to make Battle Stations more realistic, more convincing, and even more unforgettable. "Our objective is to make Battle Stations a more effective training evolution. If we achieve that goal, we send a better-trained Sailor to the Fleet — our primary customer — and that's what Great Lakes is all about," said Rear Admiral Ann Rondeau, Commander Naval Training Center Great Lakes.

An overhead view of the Outdoor Running Track at Recruit Training Center.

A view of the new barracks complex taking shape.

With that overarching guidance, the Navy's training system development experts at the Naval Air Warfare Center Training Systems Division in Florida began work on the first phase of the project - creative development of a Battle Stations story line. Under a proposed Battle Stations story line concept, recruits are marched to a pier, where they are dwarfed by a ship's mast protruding through the roof of the Battle Stations facility. Birdcalls, tug whistles and other ambient noises of a busy port echo from speakers nearby. Once aboard the Battle Stations ship, recruits go below to the mess decks to receive briefings on the night's mission. The scenarios then begin to unfold in a continuous sequence along the story line. Routine operations are followed by aggression scenarios. Recruits battle shipboard fires, repel terrorist boarders, move ammunition from a flooding magazine, and rescue injured shipmates from smoke-filled compartments.

The Battle Stations project carries with it some interesting facility and contracting challenges. "The Navy contracting system is set up to build facilities," explains Captain Mark B. Samuels, Commanding Officer of Engineering Field Activity Midwest, Great Lakes, Ill. "In this case, we will be asking prospective contractors to build the experience, then build us a brick-and-mortar facility around that experience." The design also has to be flexible to allow for modification or wholesale replacement of one or more scenarios in the future.

"The new Battle Stations must be 'refreshable,'" says Rondeau. "We have a predictable customer in the Fleet, but not a predictive one. We need to anticipate what our training priorities will be 10 years from now, and build in the flexibility to adapt to them."

"We will evaluate our Battle Stations return-on-investment, as we do the effectiveness of all of our training programs, based on feedback from the Fleet," says Captain O.W. Wright, Commanding Officer of RTC. "When a Sailor uses what he or she learned in boot camp to respond successfully to a crisis in the Fleet, there is no better validation of our training." ■

Drill Halls

for Recruit Training and Public Show

By Tim Meland, ROICC Project Manager

Two new Drill Halls are being constructed at Recruit Training Command (RTC), commonly referred to as Navy Boot Camp at Naval Training Center, Great Lakes, Ill. These are the first new Drill Halls constructed at boot camp since the early 1940's, 60 years ago, for the World War II effort. The base closures of 1993 left the only Navy boot camp at Great Lakes.

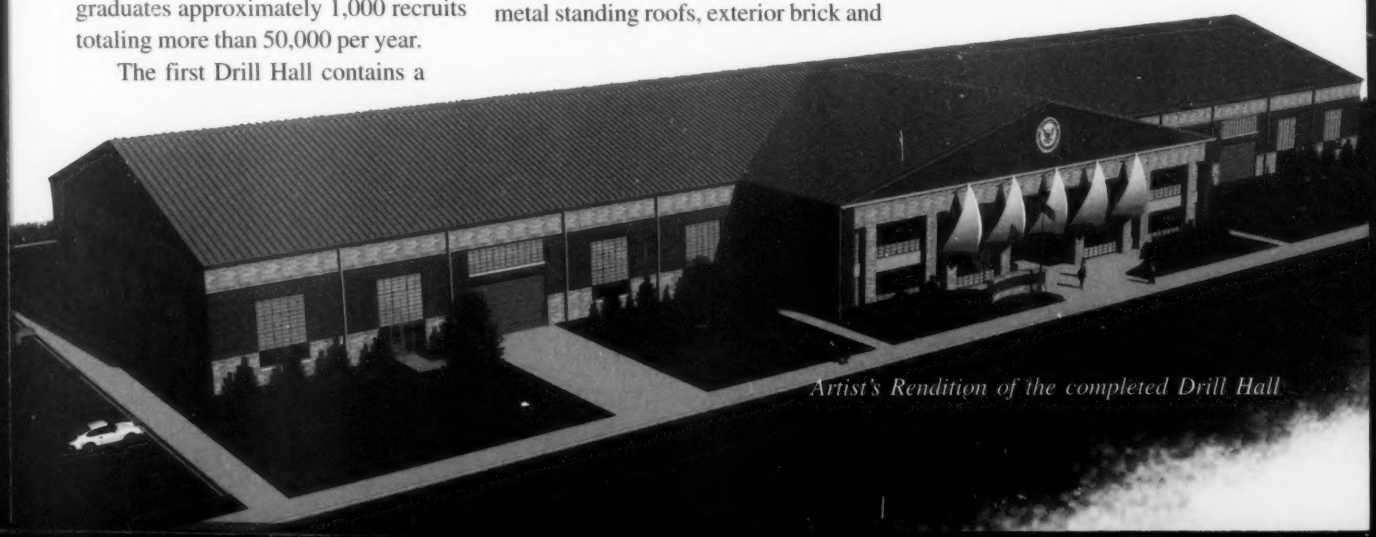
Groundbreaking for the first Drill Hall was held on May 21, 2001, and it is nearly complete. It is expected that the Navy will start using it for drilling recruits this year. The existing Drill Hall that is used for graduation ceremonies will be demolished soon for construction of a second new Drill Hall that will be used for recruit graduations on a weekly basis. Once or twice a week, the Navy graduates approximately 1,000 recruits totaling more than 50,000 per year.

The first Drill Hall contains a very large drill deck with bleacher capacity for 2,000 spectators. The building also contains administrative offices, a large classroom, a training room, large conference room and a small kitchen, dining area and recreation area for permanent staff.

The new Ceremonial Drill Hall should start construction in summer 2002 and be complete in fall 2003. This building will contain the same features as the first Drill Hall, but will have capacity for 4,000 spectators. This building is also being designed and will be constructed to current Anti Terrorism/Force Protection requirements. The building will be able to sustain certain explosive forces without major collapse, thereby minimizing casualties.

Both new Drill Halls have sloped metal standing roofs, exterior brick and split-face block and many windows, creating a very nice atmosphere for recruits and their visiting parents, friends, and guests.

A best value source selection approach was used by Southern Division, NAVFAC, Charleston, S.C., and Engineering Field Activity Midwest, Great Lakes, Ill., to award the design/build project. The work consists of design and construction of the new Drill Hall, a new road on the east and south sides of the building and demolition of an existing Drill Hall. The steel-framed masonry buildings will compliment the new buildings in RTC and the historical buildings throughout Great Lakes. They also meet factors of the base exterior architectural plan, sustainability and green design. ■



Artist's Rendition of the completed Drill Hall

Wide Open Enclosed

A view of the second story of the physical training facility, looking northward.

By LT Christopher J. Krus, CEC, USN
ROICC Project Manager, Great Lakes

A new $31-million Physical Training Facility is scheduled to be complete in July 2002, and will revolutionize the way physical training is conducted at the Recruit Training Command for the Navy's newest Sailors. James McHugh Construction Company of Chicago, Ill., has teamed with the U.S. Navy to build a state-of-the-art facility for Navy recruit physical fitness training and testing. Recruit Training Command is located at Naval Training Center, Great Lakes, Ill., which is 35 miles north of Chicago and 55 miles south of Milwaukee.

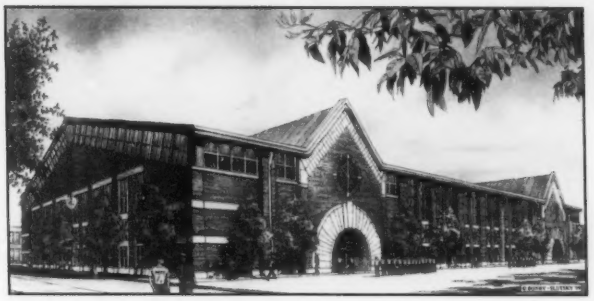
The Navy needs this new facility for several reasons. The current facility is a World War II-era Quonset hut-type building that passed its expected service life in the 1950's. In addition, the location of the aging, existing facility is almost a one-mile march from the recruit barracks and presents major problems. Dangerous traffic exposure along the marching route, needless fatigue caused by marching, and especially wasted time, makes a more conveniently located facility indispensable.

With the closing of all other Navy recruit training sites in the 1990's, Great Lakes needs to process more than 50,000 recruits per year. To accommodate such a large student throughput, a large training facility is needed. The building design is for 182,000 square feet of floor space with two main levels and a mezzanine level with offices. The two main levels contain two one-eighth mile running tracks each. These four tracks and their infield areas allow more than 1,700 recruits to exercise simultaneously.

No examples of a structure of this type and size exist, especially for an elevated second level. A similar structure -- like a stadium or arena -- is typically built all on one level, resting on the ground. The small site available makes a stacked structure the only option. A unique design is the solution, consisting of open exercise areas with only a few widely spaced support columns, allowing unobstructed and safe training.

The constrained site was a consideration in the design of this building. The site is only slightly larger than the 380-foot by 230-foot area of the building. The building had to fit in a space limited by three active streets on the north, west, and south sides, and an active Recruit

Spaces



Dental Clinic on the east side. Twenty-eight foot wide perimeter sidewalks were required for marching recruits.

A rubberized, shock-absorbent floor surface is used to limit stress fractures and other common injuries. The environmentally controlled environment allows the use of a computer-based runner-tracking program, consisting of ankle mounted computer chips and floor sensors. Each recruit needs to complete a running course of one and one-half miles to meet Navy standards, so a computer is used to keep up with all 88 recruits in 20 divisions through the 12 laps of the course.

A building of this magnitude requires a large and organized team of specialists. The prime contractor is James McHugh Construction Co. of Chicago, Ill. The architect is Wight & Co. of Downers Grove, Ill., SmithGroup Inc. of Detroit, Mich., is the structural, mechanical and electrical designer. The Resident Officer in Charge of Construction, Great Lakes, is the Navy's agent ensuring proper delivery of this facility for the Recruit Training Command.

The contract for the Physical Training Facility was awarded on November 29, 2000, for $3.8 million using best value source selection procedures. The contractor, James McHugh Construction, Co. initially mobilized on March 9, 2001. A ceremonial groundbreaking on May 21, 2001, sent the project off with a triumphant flourish.

The design was complete on October 17, 2001, at the end of an innovative phased design period that permitted construction to begin while design continued. A normal project is designed completely and then built, while this building was well underway before the ink was dry on the final drawings. The project is expected to be completed by summer 2002.

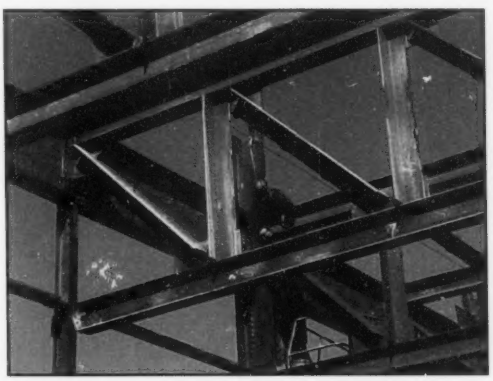
The building consists of a steel structural skeleton, brick façade, and concrete foundations. Ten-foot thick steel beams support a nine-inch thick concrete upper deck, designed to keep the floor from flexing under the live load of 850 recruits exercising in unison. A very high stiffness was required, specified at nine Hertz (cycles per second).

The designer was required to achieve architectural continuity with the historical brick buildings built around 1911 at the Naval Training Center and to build an aesthetically pleasing edifice. This was achieved using modern pre-cast stone arches for the entrances and old-fashioned hand laid bricks for the rest of the building envelope.

The lower floor is 16 feet below ground level to lower the vertical size of the building. Built on ground level, the structure would have been an 86-foot tall monster instead of a less-intrusive 71-foot tall. The use of a subterranean level created a problem in keeping the large amount of ground water in the area from seeping into the basement like a leaky boat. An extensive drainage system under and around the building intercepts the water before it can percolate up to the floor.

An ingenious traffic flow pattern was incorporated, using four stair towers to move the recruits efficiently. Recruits will not have to cross another division's workout area or the track to find their place. A travel lane, and stairs descending and ascending to the track infield, permit smooth flow in time with the precisely synchronized recruit division schedules.

Resource conservation is a strong component of the design, with the incorporation of low emission windows, computerized lighting controls, and even automatic flushing toilets to save water. An enormous air conditioning system containing 12 air handlers, each with an intake six feet across, keeps the air fresh while 1,700 recruits breath heavily and exercise. ■



Above: A view of the construction of the physical training facility. The facility is scheduled for completion in summer 2002.

Top right: Artist's rendition of the completed physical training facility.

Home Sweet Home

By LT Brian T. Lindoerfer, CEC, USN
ROICC Project Manager, Great Lakes

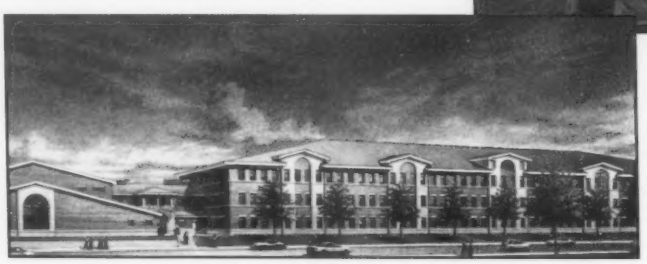
New barracks are being construction at Recruit Training Command (RTC) to provide facilities that will improve the efficiency of RTC operations and improve the quality of service for new recruits and the training staff. The new barracks will replace existing barracks at RTC, which were built between 1958 and 1966. In addition to issues related to asbestos and lead paint, wastewater capacity, spalled exterior concrete and deteriorated mortar joints, the heating, ventilation and air conditioning systems consist of steam heat, no air conditioning and are highly dependant on opening and closing windows for ventilation. The barracks are also deficient with regard to the Department of Defense open-bay berthing standards of 72 square feet per recruit. The existing facilities are operated under a waiver of the standard, which gives each recruit 50 square feet in the compartment area. A facility study conducted by Southern Division, Naval Facilities Engineering Command, Charleston, S.C., deemed replacement more efficient than renovation.

Each new barracks will provide adequate living space for 1,056 recruits, have classrooms and learning resource centers for training and a food service facility that can accommodate the building capacity in three 20 minute serving periods. These barracks will also provide the flexibility to maintain gender-integrated training and allow capacity increases without division size increases. During the "surge" period, from June through September, RTC operates at maximum capacity. This time of year sees an increased number of recruits due to high school graduations. The new barracks must be constructed to give RTC the flexibility to operate during these peek demands. Movable partition walls will be incorporated into the design to accommodate peak loading and provides a more efficient means of maintaining gender integration.

Like the new RTC drill halls (see page 17), these barracks must also meet the Department of Defense Anti-Terrorism and Force Protection Requirements Standards. These standards included specific setback distances from the perimeter fence line, roadways and parking areas. The building's structure must also withstand blasts without experiencing progressive collapse. The barracks design is a three-story concrete structure with reinforced columns and 11-inch reinforced floor slabs. The exterior walls are constructed of a CMU block with a brick and split-faced block veneer.

The RTC barracks design also incorporates sustainable concepts and will strive to receive certification under the Leadership in Energy and Environmental Design program. The designer has incorporated energy savings ideas such as use of natural lighting, heat recovery for HVAC systems and occupancy sensors for lighting and temperature control. Efforts in the construction phase have included use of recycled material, dust control procedures and protecting HVAC ductwork during the installation. The design-build team is determined to meet their goal for certification and provide a facility that will be easy to maintain in the future.

The RTC recapitalization will construct 15 new barracks buildings. These barracks will be the backbone of recruit training. These high-quality facilities will be the first impression each new recruit receives of the Navy. The barracks need to represent an image of the organization and display the pride and professionalism we take in trying to produce the best-trained Sailors in the world. ■



Left: Artist's rendition of completed north half of the RTC barracks project.

Above: A view of the construction on the south half of the barracks complex.

Cleaning Up Adak

By Mark S. Murphy, P.E.
Lead Environmental Project Manager, EFA Northwest

A variety of challenges face those performing environmental investigations and cleanup necessary to transfer former military bases to private ownership and economic reuse. At the former Naval Air Facility at Adak Island, Alaska, the Navy employed several technical approaches for investigating and cleaning up unexploded ordnance (UXO). These approaches served as an example of how a team of stakeholders can overcome obstacles and arrive at cleanup decisions that meet the needs of all concerned.

History

Since the early days of World War II, Adak Island has been used for various purposes to support the military's mission. As a result of past handling, use, storage and disposal of military munitions and materials associated with military operations at Adak, the Navy believed a number of sites on the current military reservation were potentially contaminated with UXO. The majority of the potential UXO contamination was associated with Adak's use as a support base for planned invasions of Attu and Kiska Islands, which were occupied by the Japanese during World War II.

After World War II, the Army, Air Force, and Navy have managed the military complex on Adak at different times. As late as 1994, the former Naval Air Facility complex and tenant commands on Adak supported a thriving civilian and military community of more than 5,000 people. At this time, Adak was the sixth largest community in Alaska. In 1995 Congress included the base at Adak on its closure list and the last military operations ended there in 1997. Since that time, the Navy has been involved in completing environmental investigation and cleanup in preparation for transferring the base to private ownership and reuse and to a publicly accessible wildlife refuge.

While the Navy operated the base at Adak, munitions-related hazards were successfully managed by means of a public awareness program as well as access restrictions for areas known to contain munitions or munitions remnants. With the closure of the base, it became necessary to address munitions hazards in such a way that private economic reuse by non-military personnel would be possible. Part of the approach was to perform investigations to determine the extent of the required cleanup (removal). Because Adak was listed on the National Priorities List (Superfund) in 1994, investigation and cleanup of past contamination (chemical as well as munitions) was conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Developing a New Approach

Past CERCLA-based investigation and remediation projects—including those conducted at Adak—relied on well-developed regulatory guidance, past precedents and applicable, relevant and appropriate environmental regulatory requirements. The basis for CERCLA investigations and cleanups requires establishing the baseline human health and ecological risk associated with the exposure to contamination at site. Based on this assessment, stakeholders can make decisions regarding the need for cleanup at the site to reduce risks to acceptable levels.

While the initial Superfund listing of Adak in 1994 included several sites based on potential ordnance and explosives (OE)/UXO contamination, the primary focus of the initial CERCLA investigation for these sites was remediation of possible chemical con-

Continued on next page

Continued from previous page

tamination associated with these OE/UXO sites. Since the property was managed as a military reservation, it was assumed that the Navy would continue to manage explosive hazards through educational awareness programs, access restrictions and provide response to ordnance discoveries as they occurred on the island.

The Base Realignment and Closure (BRAC) listing of the Naval complex at Adak in 1995 changed the objectives and the emphasis of the investigation and cleanup for sites with potential ordnance contamination on Adak. Relying on a long-term Navy presence to manage ordnance hazards was no longer a viable approach. With the potential of private reuse and ownership of the former Naval base complex and a majority of the 78,600-acre military reservation, it was necessary to develop a strategy for remediation of OE/UXO sites to enable future private sector land use and development. Consequently, concerns associated with explosive hazards as opposed to chemical contamination issues became the focus on sites with potential OE/UXO contamination on Adak.

The need for investigation, decision-making and cleanup process that considered the needs of all stakeholders became apparent. While CERCLA provides a mature, well-developed framework for investigation, decision-making, and cleanup of sites with chemical contamination, it provides no specific guidance for determining cleanup requirements at sites with potential explosive hazards associated with munitions. On a national level, the Department of Defense and regulatory agencies attempts at developing a Range Rule to provide guidance for investigations, decision-making, and cleanup of ordnance contaminated sites like Adak met with little or no progress. Lacking such guidance, the Navy and Adak stakeholders had to resolve disagreements over the various aspects of the investigation and cleanup of munitions on the island to support use of the former military reservation by the private sector.

The Navy performed extensive archival research related to past use, storage, and handling of munitions on the island. This research suggested extensive areas of the military reservation at Adak may be contaminated due to past munitions use, handling, storage and disposal practices and added tens of thousands of acres and many new sites to the inventory of areas potentially contaminated with munitions at Adak. In many cases these new sites were located in extremely remote areas. Some of the sites included thousands of acres on the highest mountain on the island, Mount Moffet. In particular, the Mount Moffet sites presented extreme challenges in terms of severe topography and terrain, vegetative cover, and lack of road and trail access.

A view of downtown Adak

Initially, progress toward reaching consensus on the approach for investigation and cleanup of munitions contamination on Adak was slow at best. To help untangle the munitions cleanup from the cleanup of chemical contamination, the Navy, EPA Region 10 and the State of Alaska formally agreed to create a separate Operable Unit (OU B). As part of this agreement, these parties agreed to perform the investigation and cleanup under the regulatory framework of CERCLA. However, the Navy and regulatory agencies disagreed on exactly how to conduct the investigation and cleanup of the sites within the newly designated OU B. To resolve the dispute, these disagreements were submitted to formal dispute resolution in July of 1999.

Senior managers representing the Navy, EPA, and the State of Alaska formed a Dispute Resolution Committee (DRC). The DRC directed the formation of a project team composed of project managers from the Navy, EPA and the State of Alaska, as well as representatives from the United States Fish and Wildlife Service, the Aleutian/Pribilof Islands Association (representing Alaska Native interests), and The Aleut Corporation (the intended property recipient). Support to this team was to be provided from technical consultants with expertise in munitions use, explosives safety, risk assessment, community relations, and munitions detection and remedial technology. This team was chartered with developing a Remedial Investigation and Feasibility Study Work Plan (RI/FS WP) for OU B that met the needs of all. The RI/FS WP would specifically define the data quality objectives and quality control required in field investigations to arrive at decisions on the need (or lack of need) for clearance or removal of discovered munitions.

The project team reviewed and approved all aspects of munitions investigation and removal. To foster an atmosphere of clear and open communication among the stakeholders the Navy employed the services of a professional facilitator.

Teamwork

Since the issues surrounding how to address ordnance hazards continue to be a challenge for states as well as at a national level, it's not surprising that the Adak project team struggled with this same problem. Gradually, however, the team developed a positive working rela-

tionship among its members and began to feel a collective sense of responsibility for the success of the team as a whole and a shared sense of commitment to developing a solution. With each success, the group gained confidence in its ability to meet the needs of all concerned.

The project team successfully resolved a number of technical issues that had been the core of the disagreement over how to investigate and arrive at cleanup decisions for the UXO site on Adak. One of the primary sources of disagreement was the issue of how best to characterize the sites to determine if cleanup actions were necessary. Rather than use the statistical methodology provided by Site Stats/Grid Stats and OE/Certs model that had been used at other ordnance sites, the project team elected to employ a more qualitative approach to site characterization that did not provide a strict statistical estimate of ordnance density at a site. The sampling rate for a give site was not based on an assumption of homogeneity of ordnance contamination for the site. Instead, the historical information related to the site was reviewed to develop a conceptual site model. This conceptual site model included reasonable assumptions concerning potential types of ordnance contamination at the site and the mechanisms that resulted in the potential ordnance contamination (i.e. range uses, storage of ordnance, open burning or detonation areas, etc.). The conceptual site model was used as the basis for determining site-specific sampling pattern and methodology.

Another challenge for the project team was developing a decision making tool for interpreting the sampling data from a site to arrive at a decision on the need for clean up at the site. In essence, what was need was a scoring scheme to determine, based on the sampling data, which sites posed no significant hazard, and, alternatively, which sites required additional clearance of ordnance items. To meet this need, the project team developed an Explosive Safety Hazard Analysis (ESHA) Methodology. This ESHA methodology considers the results of site sampling, relative hazard presented by the ordnance, accessibility of the ordnance, potential land uses and a number of sub factors to arrive at an explosive hazard score for the site. The score for each site was used as a basis for determining the need (or lack of need) for further action at the site.

Helicopter transport for Adak remote area UXO investigations

The success of the project team in dealing with these, and other technical issues associated with the ordnance investigation and cleanup at Adak, was due, in large measure, to the project team's consideration of Adak as a unique site with a distinct set of site conditions and stakeholder interests. Viewing the project in this context reduced the concerns of team members investigative process developed for Adak would set a precedent for other ordnance contaminated sites that were not as well suited to the methodology employed at Adak.

In June 2000 the constructive relationships among project team members made it possible to complete the task of reaching agreement on a work plan. Notable accomplishments leading up to the work plan included completing archival research for historic documents related to past ordnance use, storage, handling, and disposal of ordnance on Adak Island; identifying a comprehensive list of sites with potential munitions contamination; and developing a risk-based preliminary assessment screening approach to categorize sites.

Continued Success

The success of the partnered approach used by the Adak Project Team continued long after the completion of the work plan in 2001. The team arrived at cleanup decisions based on the information gathered during the RI/FS. As a result, in December 2001 the Navy, State of Alaska, and EPA Region 10 signed a Record of Decision for 131 sites in OU B, and much of the cleanup work for these sites had already been accomplished. With this level of partnership and trust established, and with intensive fieldwork to carry out these partnered approaches, in April 2002 Navy was able to complete a Finding of Suitability to Transfer (FOST) for approximately 57,000 acres of the military reservation. Completion of this initial FOST for the former Naval complex at Adak represents a major milestone in the process of completing the transition of Adak from military to civilian use. ■

Firefighters War

By Rance Kudo and Andrew Drucker, NFESC

Firefighting guidelines and policies require quarterly and annual Aqueous Film Foaming Foam (AFFF) discharge tests on all Aircraft Rescue and Firefighting (ARFF) vehicles. The AFFF discharge test verifies that the on-board foam delivery system is functioning properly, ensuring a vehicle's firefighting equipment is operational when called upon to save lives and property. The Naval Facilities Engineering Service Center (NFESC) has developed an external NoFoam Unit for testing the ARFF vehicle's AFFF delivery system.

Currently, the method of determining the ARFF vehicle performance in the field is to discharge AFFF through each of the vehicle's nozzles and then collect foam samples in accordance with the National Fire Protection Association (NFPA) 412 (Standard for Evaluating Aircraft Rescue and Fire Fighting Foam Equipment). Each vehicle is equipped with at least two and up to as many as five different types of nozzles, depending on the vehicle type. This procedure generates large amounts of AFFF wastewater.

Depending on the type of vehicle, the AFFF wastewater volume may be anywhere from 850 gallons to more than 2,600 gallons per vehicle for each 30-second nozzle foam discharge test. This includes flushing the system with water as required under the guidelines of NFPA 412. At this time, Department of Defense agencies have more than 1,200 ARFF vehicles in the firefighting inventory at more than 240 activities.

Fire chiefs and the local airfield authorities often conduct routine daily, weekly or monthly AFFF discharge testing, in addition to the mandated requirements, to maximize confidence in the vehicle's AFFF delivery system performance. The routine testing is a visual check of foam emitted through the various nozzles of the vehicle. It is estimated that a minimum of five seconds is required for the firefighter to verify that foam is being emitted through a single nozzle. Depending on the type of vehicle, these five-second routine checks, with system flush, generate from 500 to 1,500 gallons of AFFF wastewater per ARFF vehicle. A significant amount of AFFF wastewater may risk environmental damage. Despite its wide use and effectiveness for fire-fighting, AFFF poses an environmental risk because of its resistance to biodegradation, its toxicity due to constituent butyl carbitol (a glycol ether) and perflurooctyl sulfonates (PFOS), its high biochemical oxygen demand (BOD) and chemical oxygen demand (COD).

Beside the environmental concerns

Ray Cappillino connecting hose from the NoFoam Unit to vehicle

'm Up to NoFoam

of AFFF wastewater discharges into the environment, the extreme foaming capacity of AFFF makes the recovery and treatment of spent AFFF difficult. In some regions, the Navy is no longer allowed to discharge AFFF wastewater to industrial waste treatment plant facilities because of a risk of subsequent treatment plant fouling. When disposing of the AFFF wastewater, activities incur additional costs associated with hazardous waste handling, collection, disposal and issues of liability.

A discharge test is performed with the NoFoam Unit

NoFoam Test Kit

In fiscal year 1997, the Naval Facilities Engineering Service Center (NFESC), under the sponsorship of the Naval Facilities Engineering Command (NAVFAC), designed, built, installed and tested a system, called the NoFoam Kit, for modifying ARFF vehicles. The kit permits the testing of the ARFF vehicle's delivery system, consisting of piping, valves, pump, proportioner, eductor, and nozzles, while minimizing the release of AFFF to the environment. An environmentally benign fluid is used instead of AFFF to test the delivery system components of the ARFF vehicle, enabling readiness of the fire fighting equipment to be validated. The kit complies with the NFPA 414 and allows for the use of dyed water in "Foam Distribution System Pump Testing" and "Flushing System Testing" of ARFF vehicles.

No Foam Unit

Under the sponsorship of the Environmental Security Technology Certification Program (ESTCP), NFESC has developed and is currently in the process of demonstrating and validating an external NoFoam Unit for testing the ARFF vehicle's AFFF delivery system. This NoFoam Unit, which is completely external and universal to all models of ARFF vehicles, is an alternate to the existing NoFoam Kit requiring on-board vehicle installation/modification. Thus, most ARFF vehicles would not require the three-day kit installation but only the lower-cost simple addition of an isolation valve and pipe connection. The mobile/stationary unit has been designated the Universal Stationary/mobile NoFoam Unit (USNOFU).

The NoFoam Unit does not alter the function of the ARFF vehicle's firefighting capabilities. It incorporates the NoFoam Kit design with the added feature that 95 percent of the NoFoam Kit hardware is installed exterior to the vehicle either on

Continued on page 27

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Demonstrating BioBarrier Technology

SERDP-funded research and development efforts and ESTCP-funded demonstration and validation activities continue to provide a rapidly increasing number of outstanding technical advances. These developments are highly important and relevant to the Department of Defense(DoD), Department of Energy (DOE), Environmental Protection Agency (EPA), and many other user communities.

By Karen D. Miller, PE and Paul C. Johnson, Ph.D.

The Naval Facilities Engineering Service Center (NFESC), Arizona State University, and Equilon Enterprises, LLC are partners in an innovative Department of Defense Environmental Security Technology Certification Program (ESTCP) cleanup technology demonstration designed to contain dissolved methyl tert-butyl ether (MTBE) groundwater plumes. This full-scale demonstration is being performed to test the use of an oxygenated BioBarrier at the Navy Base Ventura County in Port Hueneme, Calif.

Surprisingly, few cost-effective in situ remedies are known for the cleanup of MTBE-impacted aquifers, and remediation by engineered in situ biodegradation was thought to be an unlikely candidate just a few years ago. This project demonstrates that MTBE-impacted groundwater can be remediated in situ through engineered aerobic biodegradation under natural-flow conditions. With respect to economics, the installation and operation costs associated with this innovative BioBarrier system are at least 60 perecent lower than those of a conventional pump and treat system. Furthermore, although it has been suggested that aerobic MTBE biodegradation will not occur in mixed MTBE, benzene, toluene, ethylbenze, and xylenes dissolved plumes, this project demonstrates otherwise.

This BioBarrier system is believed to be the largest of its kind ever implemented, spanning a dissolved MTBE plume that is more than 500 feet wide. This BioBarrier system has achieved an in situ treatment efficiency of greater than 99.9 percent for dissolved MTBE and BTEX concentrations. Perhaps, of greater importance is the fact that extensive performance data has been collected and this data is being used to generate best-practice design and cost information for this BioBarrier technology.

Challenges in Treating MTBE

MTBE (methyl tert-butyl ether) is a fuel oxygenate that has been added to gasoline since the late 1970s. Initially, it was added at concentrations of about two percent by volume for octane enhancement. More recently, it is being blended at concentrations of up to 15 percent by volume to meet today's cleaner burning fuel requirements. As a result, it is frequently found in groundwater at gasoline storage facilities, especially at leaking underground fuel sites where releases have occurred since the 1970s. It is only recently that most states have required monitoring for MTBE, so the extent of groundwater impacts from MTBE has yet to be fully assessed. Due to its high mobility and lower natural degradation potential, MTBE is expected to migrate farther and faster than other fuel components of concern (for example, benzene, toluene, ethylbenzene, and xylenes – BTEX).

The Naval Base Ventura County (NBVC), located in Port Hueneme, California contains one of the more well known dissolved MTBE plumes in the United States. The dissolved MTBE plume is currently about 5,000 feet long and 500 feet wide. It is the result of a release of about 10,000 gallons of gaso-

line that occurred in the mid-1980s from underground piping at the Base's service station. The service station leak was quickly discovered, pipes and tanks were replaced, and cleanup was performed according to regulatory standards. The resulting dissolved MTBE plume greatly outdistances the dissolved BTEX plume and residual non-aqueous phase liquid (NAPL)-stained soils by about 4,000 feet (see figure 1). The MTBE plume at NBVC is wholly confined to a shallow perched aquifer on the Base, does not affect a drinking water resource, and presents no known risk to either the environment or to the public. Since the plume is located below ground, neither residents nor employees can come in contact with it. NBVC, in conjunction with the Los Angeles Regional Water Quality Control Board, developed and implemented a control and containment plan to prevent any further movement of the plume and to ensure it is effectively contained.

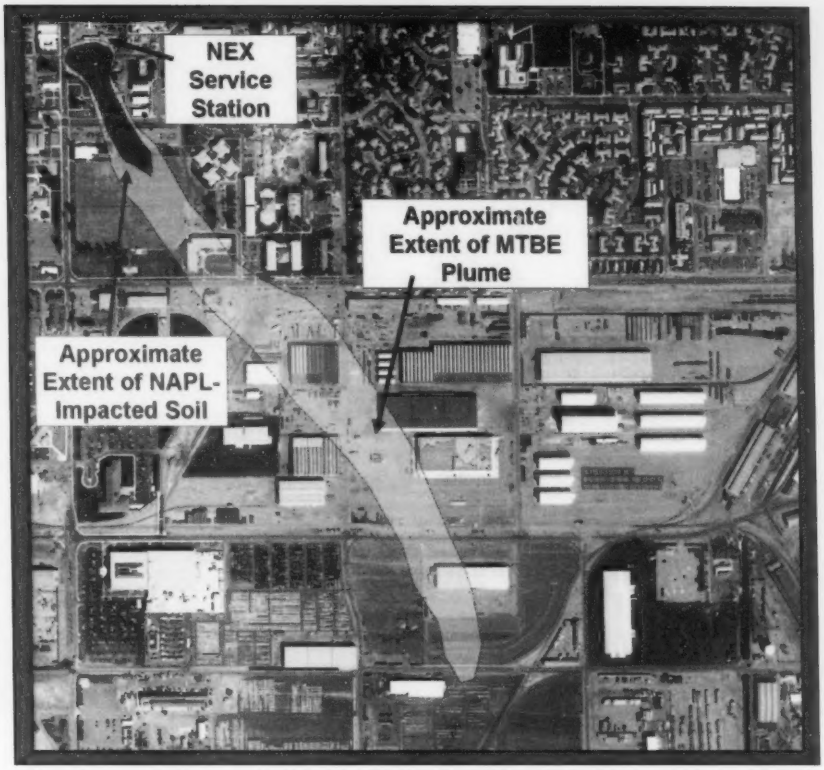

Figure 1: MTBE dissolved plume at the Navy Base Ventura County, Port Hueneme, Calif.

The treatment of MTBE-contaminated aquifers is difficult because the current understanding of treatment options is limited. It is assumed that the unique chemical properties of MTBE (relatively high solubility, low sorption, and low Henry's Law Constant compared to BTEX compound properties) render most conventional groundwater treatment approaches ineffective or impracticable. Conventional groundwater extraction followed by aboveground water treatment and discharge (i.e., "pump-and-treat") is thought to be the only reliable option. However, pump and treat is a slow source zone treatment option, maintenance-intensive, and, as a result, is a very costly option at many sites. Preliminary estimates prepared by the American Petroleum Institute (API) suggest that the presence of MTBE at a fuel release site could at least double the corrective action cost relative to a similar site without MTBE.

The MTBE BioBarrier Technology

In demonstrating the BioBarrier technology, the goals included the design, installation, and operation of a full-scale in situ aerobic BioBarrier system to treat MTBE- and BTEX-impacted groundwater leaving the source zone at the Navy Exchange service station site under natural gradient conditions. Addtionally, the system's performance and operation will be monitored so that information from this system can be used to provide valuable design and cost information for other MTBE BioBarrier systems.

The focus of the BioBarrier technology is the creation of in situ aerobic BioBarriers using both biostimulation (in situ growth of indigenous MTBE degraders) and bioaugmentation (addition of specialized MTBE-degrader cultures). Oxygen gas or air is first injected into the subsurface to increase dissolved oxygen (DO) levels and create an aerobic zone in the aquifer. The population of MTBE degrader organisms is then increased through biostimulation and bioaugmentation. The gas injection was periodic (not continuous) and trapped gas left in the aquifer continued to provide oxygen between gas injection cycles. Groundwater containing MTBE flowed through the BioBarrier under natural gradient conditions, and the MTBE is aerobically degraded in the treatment zone.

For a barrier technology such as this, it is critical that the system be placed downgradient of residual NAPL-impacted source zone soils. Otherwise, groundwater treated by the BioBarrier immediately becomes re-contaminated downgradient of the barrier. The first phase of work focused on definition of the source zone edge and dissolved plume width. This was accomplished through the use of direct-push (i.e., GeoProbe™) sampling techniques.

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The edge of the source zone was defined using a combination of qualitative and quantitative indicators. First, soil cores were collected in clear acetate liners and these were visually inspected. Where present, the residual NAPL-impacted smear zone soils were clearly visible by staining and odor. In addition, soil samples were analyzed by in-the-field methanol extraction and same-day gas chromatography-flame ionization detection analysis.

Once the edge of the source zone was defined, a cross gradient transect of groundwater samples was collected using direct-push sampling technologies. The DO concentrations were measured during sample collection, and groundwater samples were analyzed for MTBE and other hydrocarbons in the field by a heated-headspace GC-FID method. Information critical to the design of this BioBarrier system is summarized in Figure 3 (right).

The design of the large-scale BioBarrier system was based on pre-design characterization results as well as lessons learned from pilot-scale studies sponsored by Shell Global Solutions. In brief, the large-scale system consists of an automated aquifer oxygenation system, both bioaugmented (seeded) and biostimulated (unseeded) sections, and an extensive monitoring well network.

The system components include 252 gas injection wells, 174 monitoring wells, 25 satellite gas storage tanks, 154 solenoid valves, a 240-CFH oxygen generator, automated timer circuits, and associated piping and electrical lines. The 500-foot wide BioBarrier design is modular and incorporates 20-foot wide oxygen delivery modules that are replicated 25 times along the length of the BioBarrier.

As shown in Exhibit 4, the oxygen gas and bioaugmented sections are placed in the central core of the dissolved plume where MTBE and BTEX concentrations are generally >1,000 ug/L. Sections targeted for biostimulation by oxygen gas injection roughly correspond to MTBE-only regions of the plume where MTBE concentrations are approximately 100 to 1,000 ug/L. Air-only regions are reserved for the edges of the plume where only MTBE is present at 100's of ug/L and lower concentrations. This overall design was selected based on two considerations: (1) results from the pilot tests, and (2) the desire to optimize the use of the available oxygen generator, which had a limited oxygen generation capacity of 240-CFH but excess air compressor capacity.

In this design, oxygen delivery to the aquifer is accomplished by short-duration intermittent gas injection bursts. Gas trapped in the aquifer between injections continues to deliver oxygen by gas dissolution for days. Gas injection wells were installed on 2-foot centers with alternating screen depths (either 18 – 20 feet bgs or 14 - 15 feet bgs). Oxygen is supplied by a 240 CFH oxygen generator, and air is supplied by excess air available from that system's compressor. The gas injection system is fully automated and relied on a system of solenoid valves and timers.

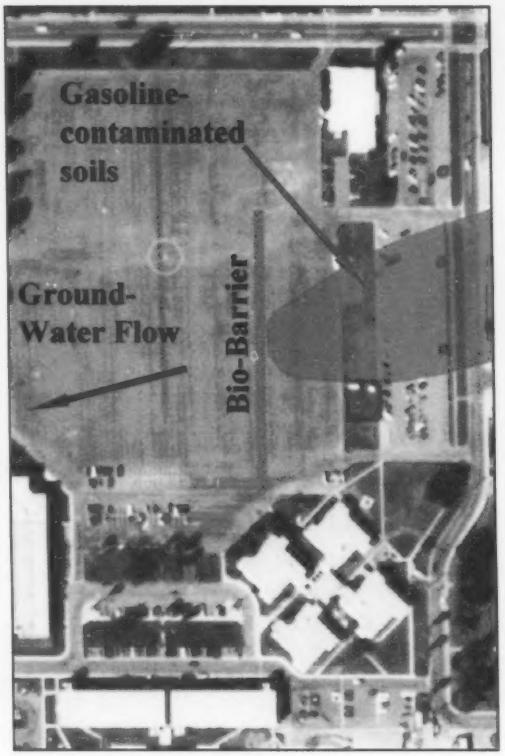


Figure 3: Graphical summary of results from the pre-design characterization

The monitoring well network at this site is fairly extensive. The reason for this is that one of the goals of this work was to collect detailed performance data that might be of use at other sites. The monitoring well network is visible in Exhibit 4, but is better defined in Exhibit 5. Co-located at most of the locations designated in Exhibit 4 are shallow (10 – 15 feet bgs) and deep (15-20 feet bgs) screened wells. Wells were also placed at either end of the BioBarrier to determine if operation of the gas injection system causes groundwater and the MTBE plume to flow around, rather than through, the BioBarrier.

Installation of gas injection and monitoring wells was accomplished using innovative direct-push well installation techniques. Approximately 400 wells were installed over a five-day period. Following this, the oxygenation system components (oxygen generator, satellite gas storage tanks, timers, and solenoid valves) were installed. Once installed, the oxygenation system was operated for approximately two months to ensure that it could be reliably operated and that it was capable of creating the desired aerobic zone. The bioaugmentation portions of the BioBarrier were then inoculated with the Equilon Enterprises' mixed and single degrader cultures (MC-100 and SC-100, respectively). Inoculation was accomplished by high pressure injection of the cultures through direct-push rods. The rods were driven down to 20 feet bgs and then pressurized to disengage the drive point and allow solution to flow out into the formation. The rods were then raised in 1-foot increments as

MTBE-degrading culture was injected over the 10 – 20 feet bgs interval.

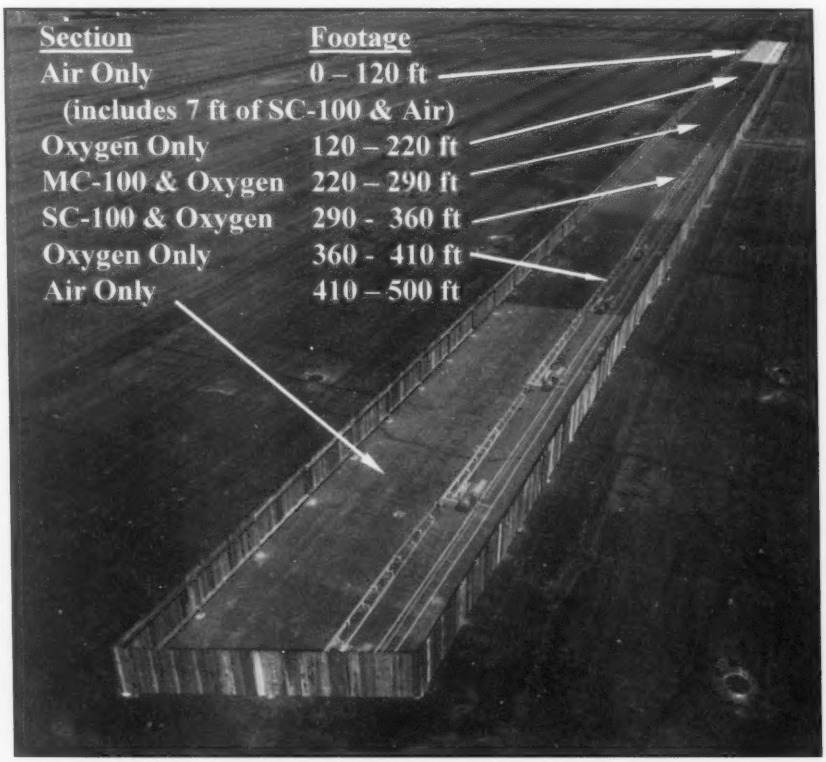
Cost Savings of Full-Scale Biobarrier Demonstration

The NBVC BioBarrier demonstration has been operational since December 2000. The cost savings of the full scale MTBE BioBarrier system compared to the full scale pump and treat system installed at the toe of the NBVC plume are significant. It is estimated that installation of a BioBarrier would cost 40 percent less compared to a comparable pump and treat system because direct push well installation technology can be utilized. The MTBE BioBarrier operations and maintenance costs are estimated to be 65 percent less than that of a pump and treat system because there are no water treatment or disposal costs.

Advantages and Limitations of In Situ MTBE Treatment Technologies

Pump and treat is generally regarded as the only proven method for MTBE impacted aquifer remediation. However, because conventional aboveground groundwater treatment technologies (e.g., carbon adsorption, air stripping, etc.) are much less effective for MTBE than for BTEX compounds, pump and treat is often relatively costly with high operation and maintenance requirements. In comparison, the advantages of using an in situ treatment technology include eliminating the need for groundwater extraction, aboveground treatment, and discharge. MTBE is mineralized in situ to innocuous products (carbon dioxide and water) by this technology, rather than being transferred to another medium (as is done in most pump and treat and air sparging applications).

Exhibit 4: Graphical picture of the system design, showing the various combinations of oxygen and air injection and bioaugmentation and biostimulation.



The BioBarrier technology is limited because it is applicable only to those settings where the treatment zone can be practically maintained in a well oxygenated state, and either an MTBE degrading culture can be delivered, or indigenous MTBE degraders can be stimulated to a level of sufficient activity. Thus, the BioBarrier's application is limited primarily by the geologic setting (e.g., soil types, depth to groundwater, etc.), in much the same way as many other in situ technologies.

Just the Beginning

The search for cost-effective MTBE remediation technologies is just beginning. It is known that conventional treatments are less effective for MTBE remediation than for other chemicals of concern. As more information on MTBE biodegradation is collected, the use of in situ bioremediation methods such as the BioBarrier may be selected to remediate MTBE-contaminated sites and prevent the migration of MTBE into the underlying groundwater. Based on the results of this full-scale demonstration, it is estimated that the use of this biotechnology can achieve cost savings of at least 60 percent at MTBE impacted fuel-spill sites

The treatment performance of the BioBarrier system has been exceptional. Groundwater treatment efficiencies in excess of 99.9 percent have been achieved and sustained during the first 12 months of operation. The MTBE concentrations down gradient of the BioBarrier are less than five parts per billion. MTBE and other dissolved petroleum hydrocarbons from gasoline are being converted to innocuous carbon dioxide and water. No wastes are being generated and no water disposal is necessary. The operation and maintenance costs are low, and the power requirements are minimal. The demonstration has been extremely visible at the national level, and it was recently awarded the prestigious 2001 Outstanding Ground Water Remediation Project Award from the National Ground Water Association. ■

Continued from page 2

Third: Respect and Support your Teammates Wherever they Work. Our clients rely on us for the facilities support we provide. What they don't want is to work with competing groups. Trust is the most precious commodity we earn from our clients, and openly bickering between parts of the team erodes that trust quickly...every time. Clients expect us to examine alternatives, make professional recommendations, and eventually we have to get on with a solution.

I believe that "negative self-talk" is probably one of the most, if not, the most destructive things to developing trust within an organization. Please do not be a part of it.

Conversely "positive self-talk" is contagious and, yes, even fun for the entire team and the client. Positive self-talk connotates substance as well, its not fluff.

Fourth: Communicate, Communicate, Communicate. Since we work in a complicated structure, with many links within our team and to many different clients, it is vitally important to communicate frequently, openly, and honestly.

You must think about what you're working on, or about to work on, and then think, "Who else do I need to coordinate with on this?" Too many times we proceed ahead with the assumption that we have adequately coordinated, based upon old conversations or assuming another person's position on some subject or project. Much better to call and discuss with that person one more time. They will always appreciate being asked, and you will be sure you're on the right track. Our matrix organizations and associated Integrated Product Teams absolutely demand this for ultimate success.

My experience has shown that "random acts of communication" can pay back dividends far greater than you would think. When was the last time you discussed something with a key client or co-worker, or an acquaintance in another department or command? Call him or her up and just chat. The worst case is that you just have a pleasant conversation for a few minutes and reinforce your network, your touchstones... the best case is that, on top of that, you learn some key fact that makes your team more effective.

Communicate, communicate, and communicate, then do it again. I cannot overstress this. It takes a lot of effort on your part, and it takes some time, but in today's world we cannot function effectively without it. Our leaders trust us to communicate our needs effectively so that they may maintain the covenant of ensuring we have the right tools and training, the opportunity to grow, to advance, to prosper, and to make a difference -- the commitment to lead us right.

Fifth and last: Be proud of your team. A winning team is proud of their accomplishments and does not put each other down. They work together to fix the problems and maintain the successes. We can always improve our processes, but we have one heck of a world-class team that can stand up in comparison to any facilities support organization, anywhere in the world.

You and your teammates are directly responsible for that reputation and for the outstanding results we produce every single day. From the emergency and service calls executed professionally and on time, to the project document prepared carefully and completely, to the professional environmental support which avoids a huge problem, to the construction or repair project executed crisply and professionally, to the Seabee support to our Commander-in-Chief and yes, even to that point paper written clearly and well...these all represent the huge number of products and services we, the facilities team, produce to support our Navy and Marine Corps. They rely on us to do it, and we do it better than anyone else. Be proud of that! Work to enhance that reputation.

One way to do that is to keep these five principles in mind: **Leadership and Professionalism, Understanding Roles, Respect and Support, Communication, and Pride.**

In any organization, coming together is a beginning, keeping together is progress and working together is success...And our success is through "One Facilities Engineer Voice". ■

Michael R. Johnson
Rear Admiral, CEC, USN
Chief of Civil Engineers
Commander, Naval Facilities Engineering Command

This *Speaking from Topside* was exerpted from a web cast presented by Rear Admiral Johnson. The web cast is one of many mediums used to update team NAVFAC and the Civil Engineer Corps on the current and future plans, policy and direction for the organization. Previous web casts have covered such topics as NAVFAC year in review, information technology, community management, and functional templates.

Those with access to the NAVFAC Intranet can view the web casts at navfacilitator.navfac.navy.mil/video/default.htm. The web casts can also be viewed on the Internet at www.navfac.navy.mil/webcast/default.htm.

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a stationary or trailer platform. This hardware consists of a control panel with monitor, flow sensor piping, and holding tank for the surrogate fluid. The firefighter simply drives the ARFF vehicle to the mobile NoFoam Unit and connects to the unit's surrogate test fluid supply line. At this point the firefighter continues through the firefighting discharge procedures. A flow meter installed in the unit senses the flowrate of the surrogate fluid and the reading is displayed on the monitor. The firefighter simply reads the monitor and quickly determines the vehicle's AFFF delivery system performance. The flow that is monitored represents the flowrate of the AFFF concentrate into the vehicle AFFF delivery system.

In addition, the firefighter has the option to employ a dye-water surrogate solution to visually reinforce confidence in the vehicle's performance. However, the firefighter must read the NoFoam Unit's rate meter to accurately determine vehicle performance. The dye concentrate is environmentally benign, biodegradable, certified by the National Sanitation Foundation (NSF) International to NSF Standard 60 for the use in potable water (Drinking Water Treatment Chemicals Health Effects) and the DOD adopted industry standard issued by the American National Standard Institute. The NoFoam Unit will accommodate any number and model of ARFF vehicles with minimal duty down time.

Field application of the NoFoam Unit, in conjunction with the NoFoam Kit, will eliminate AFFF wastewater production from routine maintenance ARFF vehicle test discharges, provide valid nozzle array discharge tests, and validate the onboard AFFF delivery system. The expected DOD benefit is the elimination of the routine ARFF vehicle nozzle discharges of AFFF wastewater onto the ground to natural or domestic water systems. Additional benefits include reducing/eliminating the need for hazardous waste handling, collection, disposal, and concerns over AFFF wastewater liability issues. By using either the NoFoam Unit or Kit, environmental concerns are no longer a controlling factor. Subsequently, the vehicle delivery system discharge tests and training may be routinely performed, providing the fire chiefs and firefighters with a higher level of confidence in meeting their firefighting missions.

Currently, NFESC is demonstrating and validating the NoFoam Unit at the Marine Corps Air Field Quantico, Va.; Air Force Research Laboratory, Fire Research Group, Tyndall Air Force Base, Fla.; and Fort Benning, Ga. ; and soon at Naval Air Station Fallon, Nev.

Hanscom Air Force Base Fire Department has initiated procurement of the NoFoam Unit. The NoFoam Unit will be used to conduct routine testing for both their Oshkosh P19 and E-One P23 ARFF vehicles. The Hanscom Fire Department has determined that acquiring the NoFoam unit, will significantly reduce AFFF wastewater generation and the associated environmental costs incurred with the waste handling of AFFF.

After a similar purchase agreement, NFESC received favorable feedback from Marine Corps Air Station (MCAS) Futenma, Okinawa regarding the delivery and implementation of their NoFoam Unit. NFESC installed and field-tested the system on five of MCAS Futenma's ARFF vehicles. Vehicle modifications typically took less than one hour per vehicle to perform. The installation and field-testing process had revealed various vehicle AFFF delivery system deficiencies ranging from missing fill connection screens to plugged orifice plate. ■

The ARFF vehicle performs roof and bumper turret discharge utilizing the NoFoam Unit.

Runway Repair

by John Adams
Supervisory General Engineer, ROICC Rota

How does NASA repair the alternate shuttle landing airfield in Ben Guerir Air Base, Morocco from "just an idea" to project complete, in seven months? They contact the Atlantic Division, Naval Facilities Engineering Command, Norfolk, Va., with a challenge. With the teamwork of Atlantic Division and Engineering Field Activity Mediterranean and the capabilities of the construction capabilities contract program all they had to do was sit back and watch.

Under the teamwork of Steve Knight (Project Manager), Darrell Bryan (Project Designer), Laurette Brunner (Contract Specialist), and Jim Baldwin (Construction Operations), the wheels started to turn. The challenges: limited and expiring funds, highly constrained schedule, shutdowns for shuttle launches, remote construction site, no A/E design, limited pool of qualified contractors, and no local ROICC office.

NASA came to LANTDIV needing to repair an existing 4,484 meter long and 50 meter wide runway and paved overrun. Under direct supervision and management of Darrell Bryan, Head of the LANTDIV Geotechnical & Paving Branch, the in-house design started in March 2001 and completed in early May. Due to funding limitations the only construction option available was to mill existing asphalt 40mm and resurface the center 30.5 m of the landing surface while fog sealing the remaining pavement. After determining the best construction approach, the next challenge was finding the best contract vehicle to provide the flexibility, control and minimum field support to successfully complete the project. Based on similar work done at Aviano Air Base, Italy, the CONCAP contract was chosen to provide the greatest potential for success.

CONCAP is one of the most versatile contracting tools LANTDIV professionals have at their disposal. The Construction Capabilities Contract (CONCAP) is a multi-year, task order contract providing design, construction and engineering services in support of disaster recovery assistance, military conflict support and military operations other than war (humanitarian assistance). The second CONCAP contract was awarded to Brown & Root in 2000; the first task order was for the Ben Guerir Air Base, Morocco, runway repair.

In determining who and how to oversee the contracted construction, LANTDIV turned to EFA Med for support and recommendations. The Resident Officer in Charge of Construction at Naval Station Rota, Spain, was experienced in distance construction management and would administer the contract. The ROICC project team of John Adams (Project Engineer) and Julio Garcia (Construction Representative) provided ROICC oversight and project coordination during construction.

NASA requirements dictated a project start of June 23, 2001, and a Moroccan military exercises dictated a completion date of September 8, 2001. This allowed only a couple of months for equipment/material mobilization, batch plant assembly, asphalt mix design, project coordination, construction, and final acceptance.

Despite all the challenges—100 degree heat, 12 hour operations seven days a week, differing site conditions, project shutdown, and miscommunications—the team achieved successful completion, quality product, and excellent value with a final project cost of $1.9 million. ■

Members Complete Basic Training at CECOS

Members of basic class numbers 221, 222, 223, and 224 graduated from the Naval School, Civil Engineer Corps, Port Hueneme, Calif. Course work is comprised of eight weeks of specialized training pertinent to the Navy's needs for shore installation engineering, public works management, construction contracting and administration, and Seabee operations.

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Guiding Principles...

Accomplish the Mission

Built on our Navy Core Values of *Honor*, *Courage*, and *Commitment*
Team NAVFAC will:

- Listen First -- seek to understand
- Communicate openly and honestly
- Respect each other
- Be Accountable

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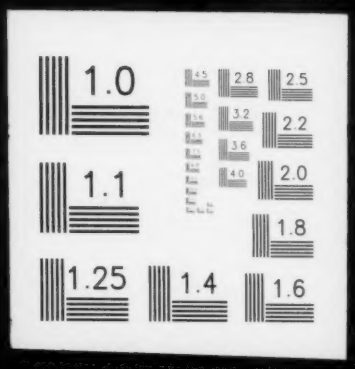
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